

Appendix K

CHART Assessment for the Lower Columbia River Steelhead ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ben Meyer (CHART Leader), Michelle Day, Patty Dornbusch, Dan Guy, Lynne Krasnow, Lance Kruzic, Nancy Munn, Mindy Simmons, Cathy Tortorici, and Rich Turner. This CHART assessment also benefitted from review and comments from the Oregon Department of Fish and Wildlife and the Washington Department of Fish and Wildlife.

ESU Description

The Lower Columbia River steelhead ESU was listed as threatened in 1997 (62 FR43937; August 18, 1997). The ESU includes all naturally spawned populations of steelhead in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington. We have recently conducted a review to update the ESU's status, taking into account new information, evaluating component resident rainbow trout populations, and considering the net contribution of artificial propagation efforts in the ESU. We have proposed that Lower Columbia River *O. mykiss* remain listed as threatened (69 FR 33102; June 14, 2004). Additionally, we have proposed that the listing include resident populations of *O. mykiss* below impassible barriers (natural and manmade) that co-occur with anadromous populations. We have also proposed that the listing include ten artificial propagation programs considered part of the ESU. The final listing determination for all *O. mykiss* ESUs was extended by six months (70 FR 37219, June 28, 2005), therefore the CHART's assessment focused on the anadromous range of *O. mykiss*.

The following brief description is based largely on life history information and excerpts from the report of the Lower Columbia Fish Recovery Board (LCFRB 2003) and the Willamette/Lower Columbia River Technical Recovery Team's (TRT) recent review of historical population structure for this ESU (Myers et al. 2003). In the lower Columbia basin, migrating adult steelhead can occur in the Columbia River year-round, but peaks in migratory activity and differences in reproductive ecotype lend themselves to classifying steelhead into two races: summer and winter steelhead. Summer steelhead return to fresh water from May to October, and enter the Columbia in a sexually immature condition,

requiring several months in fresh water to reach sexual maturity and spawn. Winter steelhead enter fresh water from November to April, and return as sexually mature individuals that spawn shortly thereafter.

Some rivers have both summer and winter steelhead, while others have only one race. Where both runs occur in the same stream, summer steelhead tend to spawn higher in the watershed than do winter forms, perhaps suggesting that summer steelhead tend to exist where winter runs do not fully utilize available habitat. In rivers where both winter and summer forms occur, they are often separated by a seasonal hydrologic barrier, such as a waterfall. Coastal streams are predominantly winter steelhead, whereas interior subbasins are dominated by summer steelhead. Historically, winter steelhead may have been excluded from interior Columbia River subbasins by Celilo Falls.

Steelhead spawn in clear, cool, well-oxygenated streams with suitable gravel and water velocity. Adult fish waiting to spawn or in the process of spawning are vulnerable to disturbance and predation in areas without suitable cover. Cover types include overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, deep water, and turbulence. Spawning occurs earlier in areas of lower elevation and where water temperature is warmer than in areas of higher elevation and cooler water temperature. Spawning occurs from January through May, and precise spawn timing is related to stream temperature. Adult steelhead, unlike salmon, do not necessarily die after spawning but return to the ocean. However, repeat spawning is not common among steelhead migrating several hundred miles or more upstream from the ocean.

Steelhead eggs hatch in 35–50 days depending on water temperature. Following hatching, alevins remain in the gravel 2 to 3 weeks until the yolk-sac is absorbed. Steelhead are spring spawners, so they spawn at a time when temperatures are typically cold, but increasing. Their spawning time must optimize avoidance of competing risks from gravel-bed scour during high flow and increasing water temperatures that can become lethal to eggs as the warm season arrives.

Fry emergence is principally determined by the time of egg deposition and the water temperature during the incubation period. Fry emergence may occur from May through August in the Yakima River subbasin. In the lower Columbia, emergence timing differs slightly between steelhead races and among subbasins. The different emergence times between races may be a function of spawning location within the watershed (and hence water temperature) or a result of genetic differences of the races. Generally, emergence occurs from March into July, with peak emergence time generally in April and May.

Following emergence, fry usually move into shallow and slow-moving margins of the stream. Fry tend to occupy shallow riffle habitats and as they grow, they inhabit areas with deeper water, a wider range of velocities, and larger substrate.

Steelhead exhibit a great deal of variability in smolt age and ocean age. The dominant age class of outmigrating steelhead smolts in the lower Columbia River is age 2. In the lower Columbia River, outmigration of steelhead smolts generally occurs from March to June, with peak migration usually in April or May.

Recovery Planning Status

The Willamette-Lower Columbia River TRT has identified 23 historical demographically independent populations of Lower Columbia River steelhead: 18 Western Cascade Range tributaries populations (the Cispus River winter-run, Tilton River winter-run, Upper Cowlitz River winter-run, Lower Cowlitz River winter-run, North Fork Toutle River winter-run, South Fork Toutle River winter-run, Coweeman River winter-run, Kalama River winter-run, Kalama River winter-run, Kalama River summer-run, North Fork Lewis River winter-run, East Fork Lewis River winter-run, North Fork Lewis River summer-run, East Fork Lewis River summer-run, Clackamas River winter-run, Salmon Creek winter-run, Sandy River winter-run, Washougal River winter-run, Washougal River summer run populations); and five Columbia River Gorge tributaries populations (the Lower Gorge tributaries winter-run, Upper Gorge tributaries winter-run, Wind River summer-run, Hood River winter-run, and Hood River summer-run populations) (Myers et al. 2003). The TRT has identified two life-history types (summer- and winter-run steelhead) and two ecological spawning zones (Cascade and Columbia Gorge) (McElhany et al. 2002). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata in the ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). A draft recovery plan for the Washington management unit of this ESU was completed by the Lower Columbia Fish Recovery Board (LCFRB 2004) and released by NMFS for public comment in April 2005. NMFS expects to use this plan as an interim regional recovery plan until a plan for the whole ESU is completed. A preliminary draft plan for Oregon areas of the ESU is expected by the end of 2005. The CHART considered LCFRB plan and the TRT products in rating each habitat area, but did not have the benefit of regional recovery plans throughout the range of this ESU. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed nine subbasins containing 41 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. As noted above, the lower Columbia River steelhead ESU inhabits two ecological zones (Cascade and Columbia Gorge) and contains two life history types (summer- and winter-run steelhead), resulting in a total of four strata for this ESU: Cascade summer- and winter-run populations, and Columbia Gorge summer- and winter-run populations (McElhany et al. 2002). Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within these strata. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Middle Columbia/Hood Subbasin (HUC4# 17070105)

The Middle Columbia/Hood subbasin is located in the eastern portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Hood River, Multnomah, and Wasco counties in Oregon, and Klickitat and Skamania counties in Washington. The subbasin contains 13 watersheds, six of which are occupied by this ESU. Occupied watersheds encompass approximately 842 mi² and 1,015 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 303 miles of occupied riverine habitat in the watersheds, including a 23-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified a single ecological zone (Columbia Gorge) containing two summer-run (Wind River and Hood River) and three winter-run (Upper Gorge Tributaries, Lower Gorge Tributaries, and Hood River) historical demographically independent populations in this subbasin. The Wind River summer-run and Hood River winter-run populations have been classified by the TRT as “core” populations (i.e., historically abundant and “may offer the most likely path to recovery”) (McElhany et al. 2003). Also, the TRT classified the Hood River winter-run steelhead as a genetic legacy population, i.e., one of “the most intact representatives of the genetic character of the ESU” (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K1 depicts the specific areas in this subbasin occupied by the ESU

and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin ranged from high to low conservation value to the ESU. Of the six HUC5s reviewed, four were rated as having high, one was rated as having medium, and one was rated as having low conservation value. The CHART noted that two HUC5s (Middle Columbia/Eagle Creek and Middle Columbia/Grays Creek) contain a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia/Sandy Subbasin (HUC4# 17080001)

The Lower Columbia/Sandy subbasin is located in the western portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Clackamas, Columbia, and Multnomah counties in Oregon, and Clark and Skamania counties in Washington. The subbasin contains nine watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,076 mi² and 1,316 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 513 miles of occupied riverine habitat in the watersheds, including a 26-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified two ecological zones (Cascade and Columbia Gorge) containing one summer-run (Washougal River) and four winter-run (Lower Gorge Tributaries, Washougal River, Salmon Creek, and Sandy River) historical demographically independent populations in this subbasin. The Washougal River summer-run and Sandy River winter-run steelhead have been classified by the TRT as "core" populations, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003). Also, the TRT classified the Washougal River summer-run steelhead as a genetic legacy population, i.e., one of "the most intact representatives of the genetic character of the ESU" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined

that the occupied HUC5 watersheds in this subbasin are of high or medium conservation value to the ESU. Of the nine HUC5s reviewed, four were rated as having high and five were rated as having medium conservation value. The CHART also noted that one HUC5 (Columbia Gorge Tributaries) contains a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lewis Subbasin (HUC4# 17080002)

The Lewis subbasin is located in southwest Washington and contained in Clark, Cowlitz, and Skamania counties (a very small and unoccupied portion in the uppermost watershed is contained in Yakima County). The subbasin contains six watersheds, two of which are currently occupied by this ESU and the remaining four are now blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 mi² and 561 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 248 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified a single ecological zone (Cascade) containing two summer-run (North Fork Lewis River and East Fork Lewis River) and two winter-run (North Fork Lewis River and East Fork Lewis River) historical demographically independent populations in this subbasin. The TRT has classified the North Fork Lewis River winter-run steelhead as a "core" population (historically abundant and "may offer the most likely path to recovery") and the East Fork Lewis River summer-run population as a genetic legacy population (one of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that both of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

The CHART also discussed whether inaccessible reaches above Merwin, Yale and Swift dams may be essential to the conservation of this ESU. The CHART believed that these unoccupied areas may be important because they once supported a TRT core population and they contain non-inundated habitats that are likely in good condition relative to other more urbanized watersheds in the Cascade region (Lower Columbia Fish Recovery Board 2003, McElhany et al. 2003). The CHART also noted that the TRT concluded that “given the limited amount of spawning habitat currently accessible it is unlikely that an independent self-sustaining [summer-run] population could exist” (Myers et al. 2003). On the other hand the CHART noted that there is currently a substantial amount of habitat still accessible throughout the range of this ESU. Therefore, the CHART concluded that the ESU would likely benefit if the extant populations had access to spawning/rearing habitat upstream but that it was unclear whether these areas are essential for conservation.

Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

The Lower Columbia/Clatskanie subbasin is located in southwest Washington and northwest Oregon. The only occupied watershed in this subbasin (Kalama River) is contained in Cowlitz and Skamania counties in Washington. This watershed encompasses approximately 237 mi² and 258 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 133 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified one ecological zone (Cascade) containing two historical demographically independent populations in this subbasin: Kalama River summer- and winter-run steelhead. The Kalama River summer-run population has been classified by the TRT as a “core” population, i.e., historically abundant and “may offer the most likely path to recovery” (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for the Kalama River HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map K4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the Kalama River HUC5 watershed was of high conservation value to the ESU. Table K2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Upper Cowlitz Subbasin (HUC4# 17080004)

The Upper Cowlitz subbasin is located in southwest Washington and contained in Lewis, Pierce, Skamania, and Yakima counties. The subbasin contains five watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,026 mi² and 1,282 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 170 miles of occupied riverine habitat in the watersheds (WDFW 2003). All of this habitat is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul operations. Myers et al. (2003) identified one ecological zone (Cascade) containing two winter-run historical demographically independent populations in this subbasin (Upper Cowlitz River and Cispus River). Both populations have been classified by the TRT as “core” populations, i.e., historically abundant and “may offer the most likely path to recovery” (McElhany et al. 2003). In addition, the TRT classified the Upper Cowlitz River winter-run population as a genetic legacy population, i.e., one of “the most intact representatives of the genetic character of the ESU.”

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were all of high conservation value to the ESU. Table K2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Cowlitz Subbasin (HUC4# 17080005)

The Lower Cowlitz subbasin is located in southwest Washington and contained in Cowlitz, Lewis, and Skamania counties. The subbasin contains eight watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 1,465 mi² and 1,510 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 785 miles of occupied riverine habitat in the watersheds (WDFW 2003). Habitat in two HUC5 watersheds – Tilton River and Riffe Reservoir – is located upstream of impassable dams (Mayfield and Mossyrock) and only accessible to anadromous fish via trap and haul

operations. Data from WDFW identified very little steelhead distribution in the Riffe Reservoir HUC5 watershed (and did not identify the Riffe and Mayfield lakes as occupied habitat). However, the CHART determined that these lakes are occupied and contain PCEs for rearing/migrating juveniles based on information regarding migrants described in Wade (2000) as well as their own knowledge of trap and haul operations in this subbasin. Myers et al. (2003) identified one ecological zone (Cascade) containing seven historical demographically independent populations of winter-run steelhead in this subbasin: Cispus River, Upper Cowlitz River, Lower Cowlitz River, Tilton River, North Fork Toutle River, South Fork Toutle River, and Coweeman River. Three populations (Cispus River, Upper Cowlitz River, and North Fork Toutle River) have been classified by the TRT as “core” populations, i.e., historically abundant and “may offer the most likely path to recovery” (McElhany et al. 2003). In addition, the TRT classified the Upper Cowlitz River winter-run steelhead as a genetic legacy population, i.e., some of “the most intact representatives of the genetic character of the ESU.”

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART determined that the occupied HUC5 watersheds in this subbasin were of high or medium conservation value to the ESU. Of the eight HUC5s reviewed, three were rated as having high and five were rated as having medium conservation value to the ESU. The CHART also noted that four HUC5s (Riffe Reservoir, Jackson Prairie, East Willapa, and Coweeman River) contained high value rearing and migration corridors connecting high value upstream watersheds with downstream reaches and the ocean. Table K2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Middle Willamette Subbasin (HUC4# 17090007)

The portion of the Middle Willamette River subbasin occupied by this ESU is downstream of Willamette Falls and includes a single HUC5 watershed (Abernethy Creek) as well as a short segment (approximately 1 mile) of the Willamette River downstream of Willamette Falls. Occupied portions of this subbasin within the ESU’s range are contained in Clackamas County, Oregon. The Abernethy Creek watershed encompasses approximately 136 mi² and 171 miles of streams. Fish distribution and

habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 26 miles of occupied riverine habitat in the subbasin (ODFW 2003a,b). Myers et al. (2003) identified one ecological zone (Cascade) containing a single historical demographically independent population in this subbasin: Clackamas River winter-run steelhead. This population has been classified by the TRT as a “core” population, i.e., historically abundant and “may offer the most likely path to recovery” (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in the Abernethy Creek watershed contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the Abernethy Creek HUC5 watershed was of low conservation value to the ESU. Table K2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Clackamas Subbasin (HUC4# 17090011)

The Clackamas subbasin is a Cascade Range drainage of the lower Willamette River and is contained in Clackamas and Marion counties, Oregon. The subbasin contains six watersheds, all of which are occupied by this ESU. Occupied watersheds encompass approximately 942 mi² and 1,109 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 274 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified a single ecological zone (Cascade) containing a single historical demographically independent population in this subbasin: Clackamas River winter-run steelhead. This population has been classified by the TRT as a “core” population, i.e., historically abundant and “may offer the most likely path to recovery” (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K8 depicts the specific areas in this subbasin occupied by the ESU

and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Willamette Subbasin (HUC4# 17090012)

The Lower Willamette subbasin is located at the confluence of the Willamette and Columbia rivers in Northwest Oregon. Occupied watersheds in this subbasin are contained in Clackamas, Multnomah, and Washington counties, Oregon. The subbasin contains three watersheds, all of which are occupied by this ESU. Two of the HUC5 watersheds (Columbia Slough/Willamette River and Scappoose Creek) do not contain spawning PCEs for this ESU but instead are used solely for rearing and migration. Occupied watersheds encompass approximately 408 mi² and 448 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) identify approximately 88 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b). Myers et al. (2003) identified a single ecological zone (Cascade) containing one historical demographically independent population of winter-run steelhead in this subbasin (Clackamas River). This population has been classified by the TRT as a "core" population, i.e., historically abundant and "may offer the most likely path to recovery" (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table K1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map K9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of high conservation value. The CHART also noted that Columbia Slough and Smith and Bybee Lakes may provide important rearing habitat for juvenile steelhead. Table K2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure K1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia River Corridor

The lower Columbia River rearing and migration corridor consists of that segment from the mouth of the Columbia River at the Pacific Ocean upstream to an imaginary line

connecting the confluences of the Sandy River (Oregon) and Washougal River (Washington). This corridor overlaps with the following counties: Clatsop, Columbia, and Multnomah counties in Oregon, and Clark, Cowlitz, Pacific, and Wahkiakum counties in Washington. Fish distribution and habitat use data from ODFW and WDFW identify approximately 118 miles of occupied riverine and estuarine habitat in this corridor (ODFW 2003a,b; WDFW 2003). Table K1 summarizes the total number of occupied reaches in this corridor containing rearing or migration PCEs, as well as management activities that may affect the PCEs.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Columbia River corridor was of high conservation value to the ESU. Other upstream reaches of the Columbia River corridor (within Middle Columbia/Hood subbasin and Lower Columbia/Sandy subbasins above) are also high value for rearing/migration. The CHART noted that the lower Columbia River corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed within the geographical area occupied by this ESU. However, based on public comments and new information reviewed the CHART identified changes to the delineation of occupied habitat areas in two watersheds (Middle Columbia/ Grays Creek and Lower Lewis River HUC5). The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU. And Tables K1 and K2 reflect the final CHART assessments, including the following changes in habitat area delineations:

Subbasin	Watershed code	Watershed name	Changes from Initial CHART Assessment
Middle Columbia/Hood	1707010512	Middle Columbia/Grays Creek	Added 4 miles (6.4 km) of occupied habitat areas.
Lewis	1708000206	Lower Lewis River	Removed 1 mile (1.6 km) of unoccupied stream reach.

References and Sources of Information

References cited above as well as key reports and data sets reviewed by the CHART include the following:

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Table L1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Lower Columbia River Steelhead ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Middle Columbia/Hood	East Fork Hood River	1707010506	70.9	0	0		A, C, F, I, R
	Middle Columbia/Hood	West Fork Hood River	1707010507	35.3	0	0		A, F, R
	Middle Columbia/Hood	Hood River	1707010508	22.3	1.1	0		A, C, D, F, R, I, U
	Middle Columbia/Hood	Wind River	1707010511	70.1	3.8	52.3		F, R, U
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	5.2	0.1	17.3		R, U
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	7.7	1.1	16.1		D, R, U
	Lower Columbia/Sandy	Salmon River	1708000101	28	0.7	0		F, C, R
	Lower Columbia/Sandy	Zigzag River	1708000102	36.5	0	0		F, C, R
	Lower Columbia/Sandy	Upper Sandy River	1708000103	35.6	0	0		F, R
	Lower Columbia/Sandy	Middle Sandy River	1708000104	36.7	0.1	0		D, R, U
	Lower Columbia/Sandy	Bull Run River	1708000105	6.8	0	0		D, F, R
	Lower Columbia/Sandy	Washougal River	1708000106	68.9	1.9	59		C, F, R, S, U, W
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	17.1	8.5	61.4		C, D, F, R, U, W
	Lower Columbia/Sandy	Lower Sandy River	1708000108	27.9	4.3	0		A, C, F, R, U
	Lower Columbia/Sandy	Salmon Creek	1708000109	31.6	4.2	83.5		A, C, F, R, U, W
	Lewis	Upper Lewis River	1708000201	0	0	0	mm	
	Lewis	Muddy River	1708000202	0	0	0	nn	
	Lewis	Swift Reservoir	1708000203	0	0	0	oo	
	Lewis	Yale Reservoir	1708000204	0	0	0	pp	

^{mm} The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

ⁿⁿ The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

^{oo} Swift Dam, as well as the downstream dams Merwin and Yale, is currently a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

^{pp} Yale Dam, as well as downstream Merwin Dam, is currently a barrier to fish distribution in this watershed. Unoccupied habitat areas above these dams may be essential to conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Lewis	East Fork Lewis River	1708000205	60.9	20.5	89.3		A, C, F, R, S, U, W
	Lewis	Lower Lewis River	1708000206	34.1	1	42.5		A, C, D, F, R, U, W
	Lower Columbia/Clatskanie	Kalama River	1708000301	58.5	1.2	73.3		C, F, R, U, W
	Upper Cowlitz	Headwaters Cowlitz River	1708000401	1.3	0	6.7		C, F, R
	Upper Cowlitz	Upper Cowlitz River	1708000402	0	0	36.8		C, F, R
	Upper Cowlitz	Cowlitz Valley Frontal	1708000403	0	0	59.4		A, F, R, U
	Upper Cowlitz	Upper Cispus River	1708000404	0	0	22.3		C, F, R
	Upper Cowlitz	Lower Cispus River	1708000405	0	0	43.8		C, F, R
	Cowlitz	Tilton River	1708000501	0	0	67.2		C, D, F, R, U
	Cowlitz	Riffe Reservoir	1708000502	0	0	30.7		A, C, D, F, R
	Cowlitz	Jackson Prairie	1708000503	51.1	1.4	85.4		A, C, D, F, R
	Cowlitz	North Fork Toutle River	1708000504	11.6	6	32.9		F, R
	Cowlitz	Green River	1708000505	35.1	0.5	35.5		F, R
	Cowlitz	South Fork Toutle River	1708000506	43.6	2.6	35.1		F, R
	Cowlitz	East Willapa	1708000507	78.5	22.1	120.5		A, C, F, R, U, W
	Cowlitz	Coweeman	1708000508	44.9	21.3	58.8		A, C, F, R, U, W
	Middle Willamette	Abernethy Creek	1709000704	19.4	6.7	0		A, C, D, R, U
	Clackamas	Collawash	1709001101	34	0	0		F, R
	Clackamas	Upper Clackamas	1709001102	53	0	0		F, R
	Clackamas	Oak Grove Fork	1709001103	4.2	0	0		D, F, G, R
	Clackamas	Middle Clackamas	1709001104	45.6	2.5	0.4		D, F, R
	Clackamas	Eagle Creek	1709001105	36.7	0	0		A, F, R
	Clackamas	Lower Clackamas River	1709001106	89.8	4.9	2.4		A, C, D, I, R, U, W

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Lower Willamette	Johnson Creek	1709001201	24.5	14.5	1.7		A, C, I, R, U, W
	Lower Willamette	Scappoose Creek	1709001202	0	21.3	0		A, C, F, I, R, U, W
	Lower Willamette	Columbia Slough/Willamette River	1709001203	0	26.2	0		A, C, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	1.1	131.5 ^{qq}		C, D, I, R, T, U, W

* Some streams classified as “Migration/Presence PCEs” may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These watersheds historically supported spawning and rearing PCEs. The CHART determined that these watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.

*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the “Special Management Considerations or Protection” section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by LCFRB (2003), Subbasin Summary Reports of the NWPPC, and land use/land cover GIS layers from the U.S. Geological Survey.

^{qq} The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table K2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Lower Columbia River Steelhead ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	East Fork Hood River	1707010506	2	2	2	3	1	3	13	Moderate-high HUC5 score; habitat relatively more extensive in this HUC5 than in most other areas of the Gorge region (especially for winter-run fish); PCEs support one of three summer-run and one of three winter-run TRT historical steelhead populations (both core and genetic legacy populations) in the Gorge region; ODFW considers Hood River as a priority area for this ESU	High
	Middle Columbia/Hood	West Fork Hood River	1707010507	2	2	2	3	1	3	13	Moderate-high HUC5 score; habitat relatively more extensive in this HUC5 than in most other areas of the Gorge region (especially for summer-run fish); PCEs support one of three summer-run and one of three winter-run TRT historical steelhead populations (both core and genetic legacy populations) in the Gorge region; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers Hood River as a priority area for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Hood River	1707010508	2	1	2	3	1	3	12	Moderate-high HUC5 score; PCEs support one of three summer-run and one of three winter-run TRT historical steelhead populations (both core and genetic legacy populations) in the Gorge region; HUC5 contains important connectivity reaches for upstream HUC5s (including one containing a FEMAT key watershed for at-risk anadromous salmonids); ODFW considers Hood River as a priority area for this ESU	High
	Middle Columbia/Hood	Wind River	1707010511	3	2	2	2	2	3	14	Highest HUC5 score for entire ESU; PCEs support one of three summer-run and one of three winter-run TRT historical populations in the Gorge region; passage over Shipherd Falls improved access to extensive summer-and winter-run habitat for the Gorge region; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids	High
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	0	2	2	1	1	2	8	Moderate HUC5 score; PCEs limited in this HUC5 and likely always were due to gradient barriers and small drainage size; HUC5 supports a TRT historical winter-run population but production likely low in this HUC5; mainstem Columbia River is high value connectivity corridor	Low

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	1	2	2	1	1	3	10	Moderate HUC5 score; PCEs in tributary habitat in HUC5 supports two TRT historical winter-run populations; downstream HUC5 likely more important to the Lower Gorge population and the Wind River HUC5 likely more important to the Upper Gorge population; mainstem Columbia River is high value connectivity corridor	Medium
	Lower Columbia/Sandy	Salmon River	1708000101	3	2	2	2	2	2	13	High HUC5 score; extensive PCEs support TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers Salmon River as a priority area for this ESU	High
	Lower Columbia/Sandy	Zigzag River	1708000102	3	2	2	2	2	2	13	High HUC5 score; extensive PCEs support TRT core winter-run population	High
	Lower Columbia/Sandy	Upper Sandy River	1708000103	3	2	2	2	2	2	13	High HUC5 score; extensive PCEs support TRT core winter-run population	High
	Lower Columbia/Sandy	Middle Sandy River	1708000104	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs support TRT core winter-run population quality impaired by Marmot Dam; HUC5 contains important connectivity reaches for upstream HUC5s (including one containing a FEMAT key watershed for at-risk anadromous salmonids)	Medium
	Lower Columbia/Sandy	Bull Run River	1708000105	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs more limited due to dams in this HUC5, but still support TRT core winter-run fish	Medium
	Lower Columbia/Sandy	Washougal River	1708000106	2	1	2	3	2	3	13	Moderate-high HUC5 score; extensive PCEs support a TRT core and genetic legacy summer-run population as well as a winter-run population	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	2	2	2	1	1	3	11	Moderate-high HUC5 score; tributary habitat in HUC5 supports at least one TRT historical core winter-run population; PCEs probably not as important to Washougal River population, and those supporting Lower Gorge population probably never were abundant/extensive due to migration barriers and drainage size; mainstem Columbia River is high value connectivity corridor supporting all upstream populations.	Medium
	Lower Columbia/Sandy	Lower Sandy River	1708000108	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs less extensive and quality lower than upstream HUC5s, but still support TRT core winter-run fish	Medium
	Lower Columbia/Sandy	Salmon Creek	1708000109	2	1	2	0	1	3	9	Moderate HUC5 score; PCEs support a TRT winter-run population, but limited and degraded in this HUC5; not identified as a core population but HUC5 is only habitat for this population; other HUC5s supporting winter-run fish likely to have higher conservation value in the Cascade region	Medium
	Lewis	Upper Lewis River	1708000201							*	<u>Unoccupied HUC5</u> , but population expansion into this HUC5 possibly essential for conservation; The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed; Unoccupied habitat areas above these dams may be essential to conservation; nearly the entire area is a FEMAT key watershed for at-risk anadromous salmonids	Possibly High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lewis	Muddy River	1708000202							*	<u>Unoccupied HUC5</u> , but population expansion into this HUC5 possibly essential for conservation; The downstream dams Merwin, Yale, and Swift are barriers to fish distribution in this watershed; Unoccupied habitat areas above these dams may be essential to conservation; nearly the entire area is a FEMAT key watershed for at-risk anadromous salmonids	Possibly High
	Lewis	Swift Reservoir	1708000203							*	<u>Unoccupied HUC5</u> , but population expansion into this HUC5 possibly essential for conservation; Swift Dam, as well as downstream dams Merwin and Yale, is currently a barrier to fish distribution; Unoccupied habitat areas above these dams may be essential to conservation; HUC5 contains connectivity reaches to upstream to upstream areas that are FEMAT key watersheds for at-risk anadromous salmonids	Possibly High
	Lewis	Yale Reservoir	1708000204							*	<u>Unoccupied HUC5</u> , but population expansion into this HUC5 possibly essential for conservation; Yale Dam, as well as downstream Merwin Dam, is currently a barrier to fish distribution; Unoccupied habitat areas above these dams may be essential to conservation; HUC5 contains connectivity reaches to upstream to upstream areas that are FEMAT key watersheds for at-risk anadromous salmonids	Possibly High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lewis	East Fork Lewis River	1708000205	3	1	2	3	2	3	14	Highest HUC5 score for entire ESU; PCEs support TRT summer- and winter-run populations; summer-run fish are a TRT genetic legacy population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; improved access above falls likely makes PCEs more extensive now than historically	High
	Lewis	Lower Lewis River	1708000206	1	1	2	1	2	3	10	Moderate HUC5 score; PCEs support TRT summer- and winter-run populations; winter-run fish are a TRT core population; conservation of these PCEs will be especially important if historical habitats upstream are made accessible; Watershed contains unoccupied habitat areas above Merwin Dam that may be essential for conservation.	High
	Lower Columbia/ Clatskanie	Kalama River	1708000301	1	2	2	1	2	3	11	Moderate-high HUC5 score; supports summer- and winter-run Kalama River populations (including some reaches for N. Fork Lewis winter-run populations); summer-run Kalama River fish are a TRT core population	High
	Upper Cowlitz	Headwaters Cowlitz River	1708000401	2	2	1	3	2	2	12	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy winter-run population)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Cowlitz	Upper Cowlitz River	1708000402	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy winter-run population); PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids	High
	Upper Cowlitz	Cowlitz Valley Frontal	1708000403	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Upper Cowlitz River identified by TRT as a core and genetic legacy winter-run population)	High
	Upper Cowlitz	Upper Cispus River	1708000404	2	2	2	1	2	2	11	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Cispus River identified by TRT as a core winter-run population)	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Cowlitz	Lower Cispus River	1708000405	2	2	2	1	2	2	11	Moderate-high HUC5 score; PCEs support winter-run fish via trap and haul; CHART believed it was important to emphasize conservation value of upper Cowlitz/Cispus HUC5s due to their historic importance and potential to promote conservation of the ESU (i.e., Cispus River identified by TRT as a core winter-run population)	High
	Cowlitz	Tilton River	1708000501	1	1	2	1	2	3	10	Moderate HUC5 score; PCEs support a TRT winter-run population via trap and haul; HUC5 is only habitat for a TRT historical winter-run population; other areas in Cowlitz River basin likely more important to ESU than this watershed	Medium
	Cowlitz	Riffe Reservoir	1708000502	1	1	1	3	2	2	10	Moderate HUC5 score; PCEs support two TRT historic winter-run populations (including core and genetic legacy populations) via trap and haul; PCEs degraded due to inundation; HUC5 primarily important as rearing/migration corridor for upstream populations	High
	Cowlitz	Jackson Prairie	1708000503	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs support four TRT winter-run populations, including core and genetic legacy populations; HUC5 is important as a high value rearing/migration corridor connecting upstream HUC5s/populations with the ocean	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Cowlitz	North Fork Toutle River	1708000504	2	1	2	2	2	2	11	Moderate-high HUC5 score; PCEs support a TRT core winter-run population but not as extensive as in Green River HUC5 ; CHART noted recolonization of area despite volcano-related impacts on PCEs	Medium
	Cowlitz	Green River	1708000505	3	1	2	2	2	2	12	Moderate-high HUC5 score; PCEs support a TRT core winter-run population and more extensive here than other HUC5s supporting this population; CHART noted recolonization of area despite volcano-related impacts on PCEs	High
	Cowlitz	South Fork Toutle River	1708000506	2	1	2	2	2	3	12	Moderate-high HUC5 score; PCEs support a TRT winter-run population (but not a core or genetic legacy population); CHART noted recolonization of area despite volcano-related impacts on PCEs	Medium
	Cowlitz	East Willapa	1708000507	2	1	2	2	2	3	12	Moderate-high HUC5 score; PCEs support spawning range of Lower Cowlitz River population as well as rearing/migration for all upstream populations (both core and legacy)	High
	Cowlitz	Coweeman	1708000508	2	1	2	1	2	3	11	Moderate-high HUC5 score; PCEs support spawning range of Cowlitz River winter-run population (but not a core or genetic legacy population); PCEs also support rearing/migration for all upstream populations (both core and legacy)	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Willamette	Abernethy Creek	1709000704	2	1	2	3	1	2	11	Moderate-high HUC5 score; PCEs support a TRT winter-run core population but are degraded with limited potential and likely not as important as in other watersheds supporting this population	Low
	Clackamas	Collawash	1709001101	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High
	Clackamas	Upper Clackamas	1709001102	2	2	2	2	2	2	12	Moderate-high HUC5 score; PCEs support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High
	Clackamas	Oak Grove Fork	1709001103	1	2	2	2	2	2	11	Moderate-high HUC5 score; PCEs more limited in this HUC5 but still support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High
	Clackamas	Middle Clackamas	1709001104	1	1	2	2	2	2	10	Moderate HUC5 score; PCEs support a TRT core winter-run population; PCEs overlap with a FEMAT key watershed for at-risk anadromous salmonids; ODFW considers upper Clackamas River as a priority area for this ESU	High

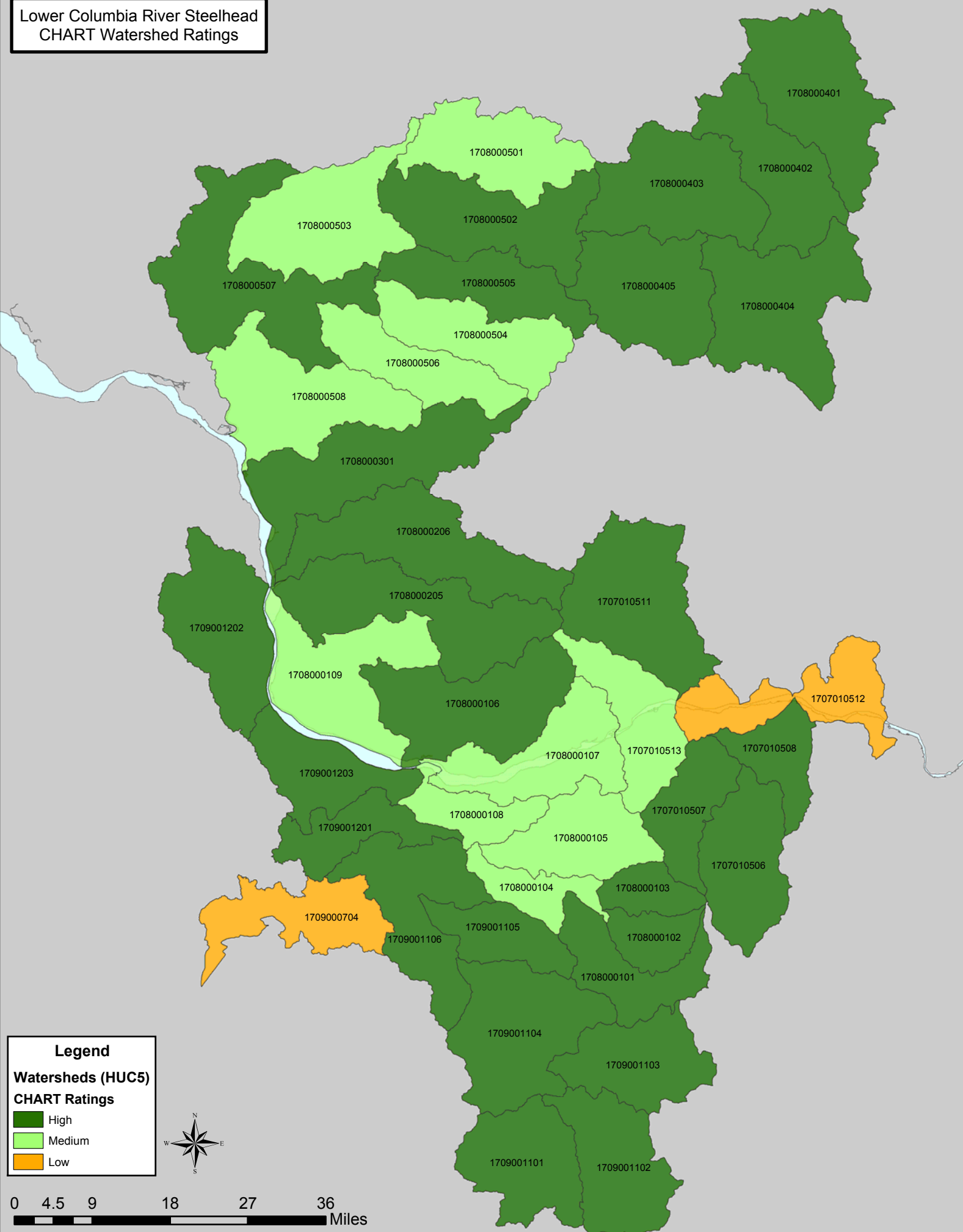
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Clackamas	Eagle Creek	1709001105	1	2	2	2	2	2	11	Moderate-high HUC5 score; PCEs support a TRT core winter-run population but probably more degraded than those in other HUC5s supporting this population	High
	Clackamas	Lower Clackamas River	1709001106	3	1	2	2	2	2	12	Moderate-high HUC5 score; extensive PCEs support spawning/rearing as well as rearing/migration for upstream HUC5s; PCEs support a TRT core winter-run population as well as fish from ODFW priority areas upstream	High
	Lower Willamette	Johnson Creek	1709001201	2	1	2	3	2	2	12	Moderate-high HUC5 score; PCEs support a TRT winter-run core population; PCE quality degraded but CHART noted that HUC5 may provide important refuge habitat for Clackamas River population and may warrant consideration for unique adaptations; Willamette River is a high value rearing/migration corridor	High
	Lower Willamette	Scappoose Creek	1709001202	1	1	2	1	1	2	8	Moderate HUC5 score; Multnomah Channel of the Willamette River is an important rearing/migration corridor connecting high value upstream HUC5s in Willamette River (including a TRT core population) with downstream reaches and the ocean.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Lower Willamette	Columbia Slough/Willamette River	1709001203	1	0	2	3	2	3	11	Moderate-high HUC5 score; Lower Willamette River is a high value rearing/migration corridor connecting high value upstream HUC5s (in both Willamette and Columbia rivers) and TRT core/genetic legacy populations with downstream reaches and the ocean.	High
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA							NS	Area not scored since many reaches are outside HUC5 boundaries. However, the CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

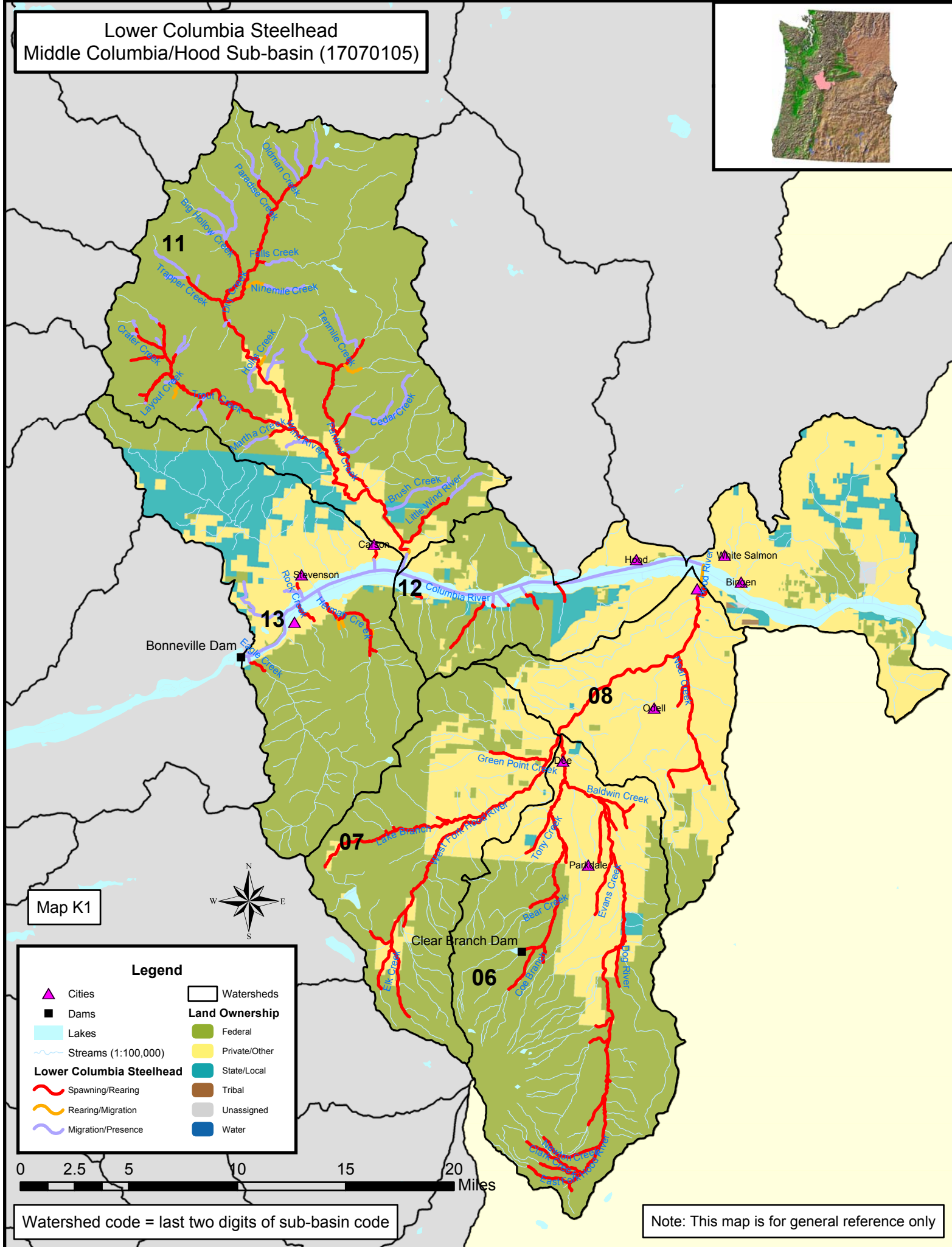
* Indicates that HUC5 contains blocked/inaccessible areas that the CHART concluded may be essential for ESU conservation.

Figure K1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Lower Columbia River Steelhead ESU

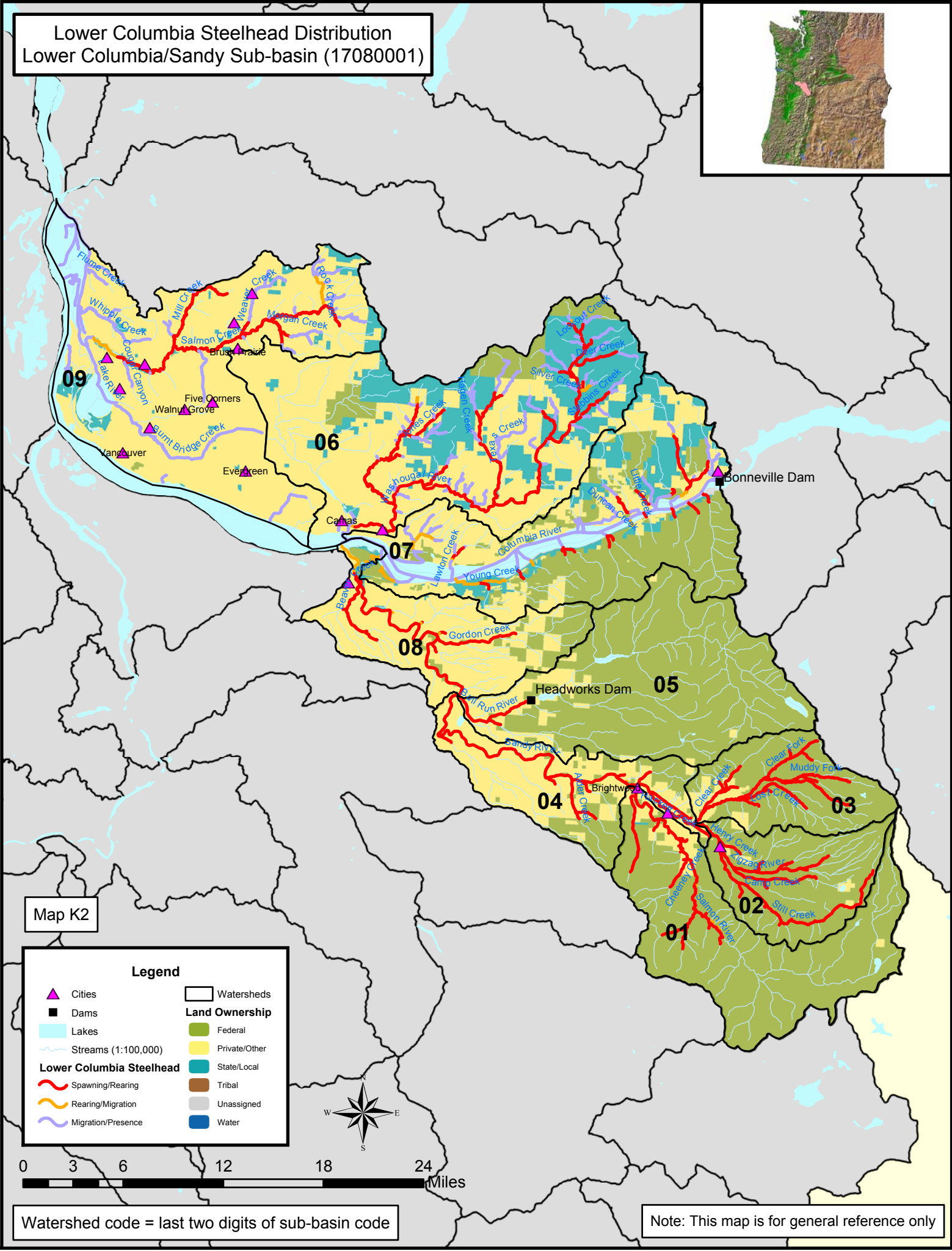
Lower Columbia River Steelhead CHART Watershed Ratings



Lower Columbia Steelhead Middle Columbia/Hood Sub-basin (17070105)



Lower Columbia Steelhead Distribution
Lower Columbia/Sandy Sub-basin (17080001)



Map K2

Legend

- Cities
- Dams
- Lakes
- Streams (1:100,000)
- Lower Columbia Steelhead**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds

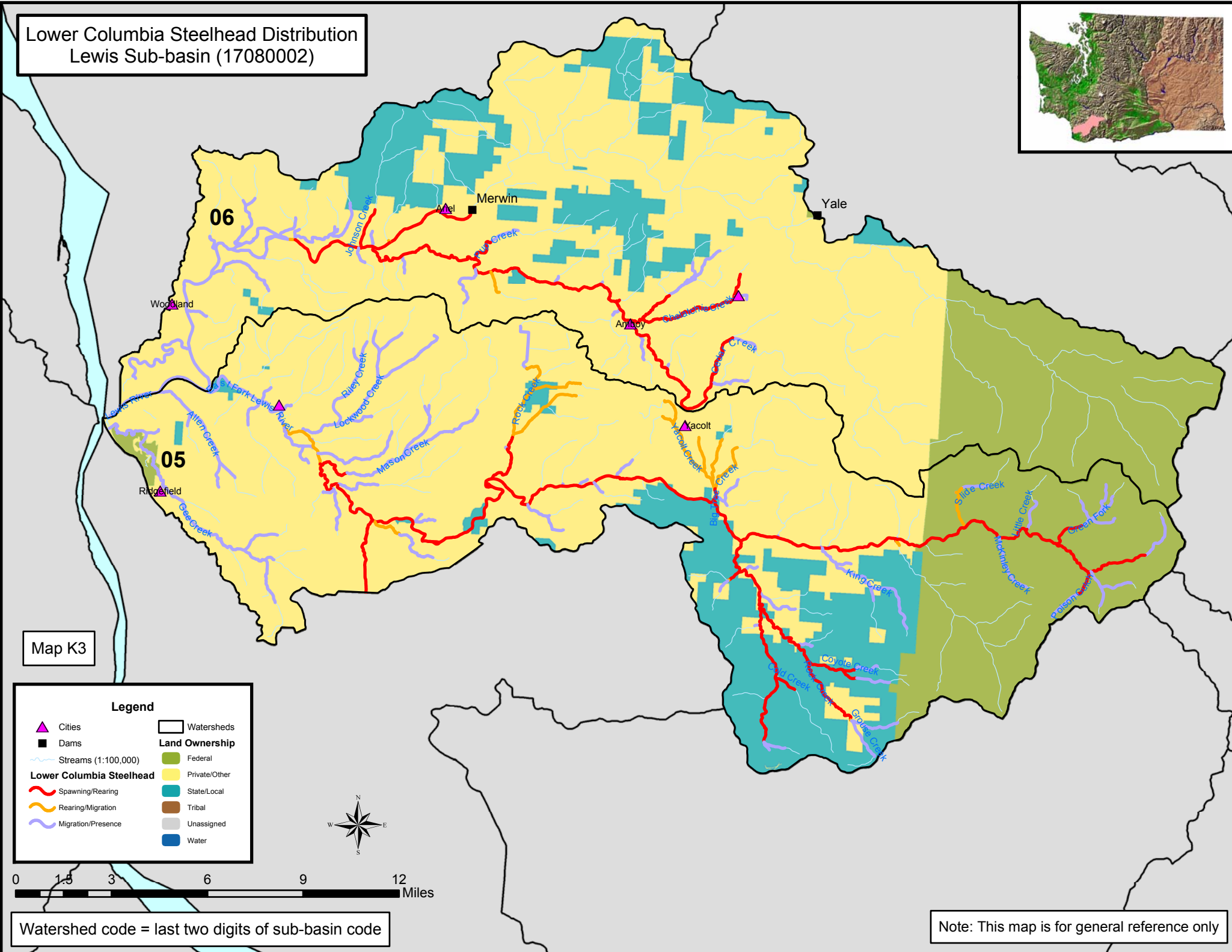


0 3 6 12 18 24 Miles

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Lower Columbia Steelhead Distribution
Lewis Sub-basin (17080002)



Map K3

Legend

▲ Cities

■ Dams

— Streams (1:100,000)

Lower Columbia Steelhead

— Spawning/Rearing

— Rearing/Migration

— Migration/Presence

□ Watersheds

Land Ownership

■ Federal

■ Private/Other

■ State/Local

■ Tribal

■ Unassigned

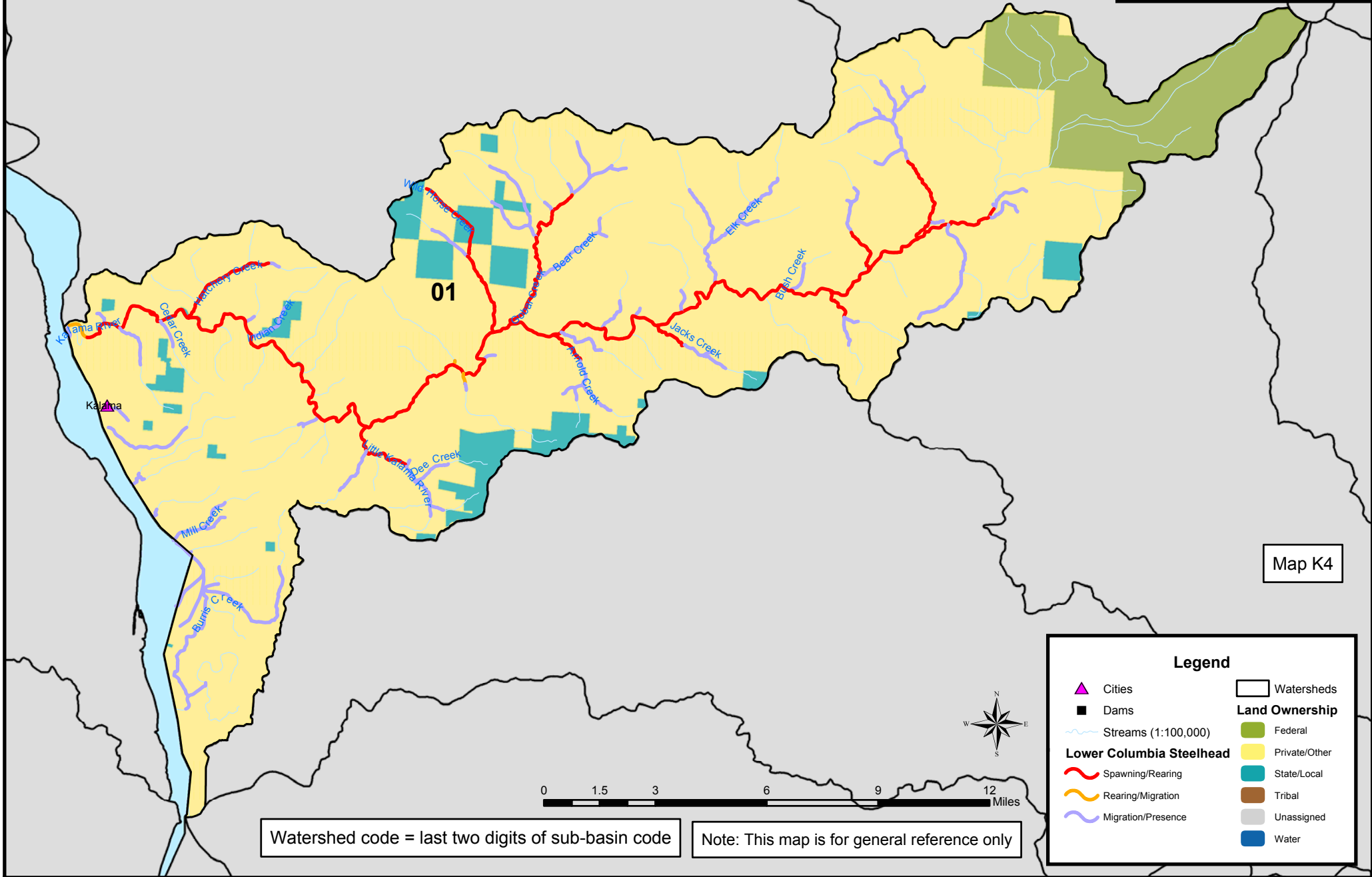
■ Water

0 1.5 3 6 9 12 Miles

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

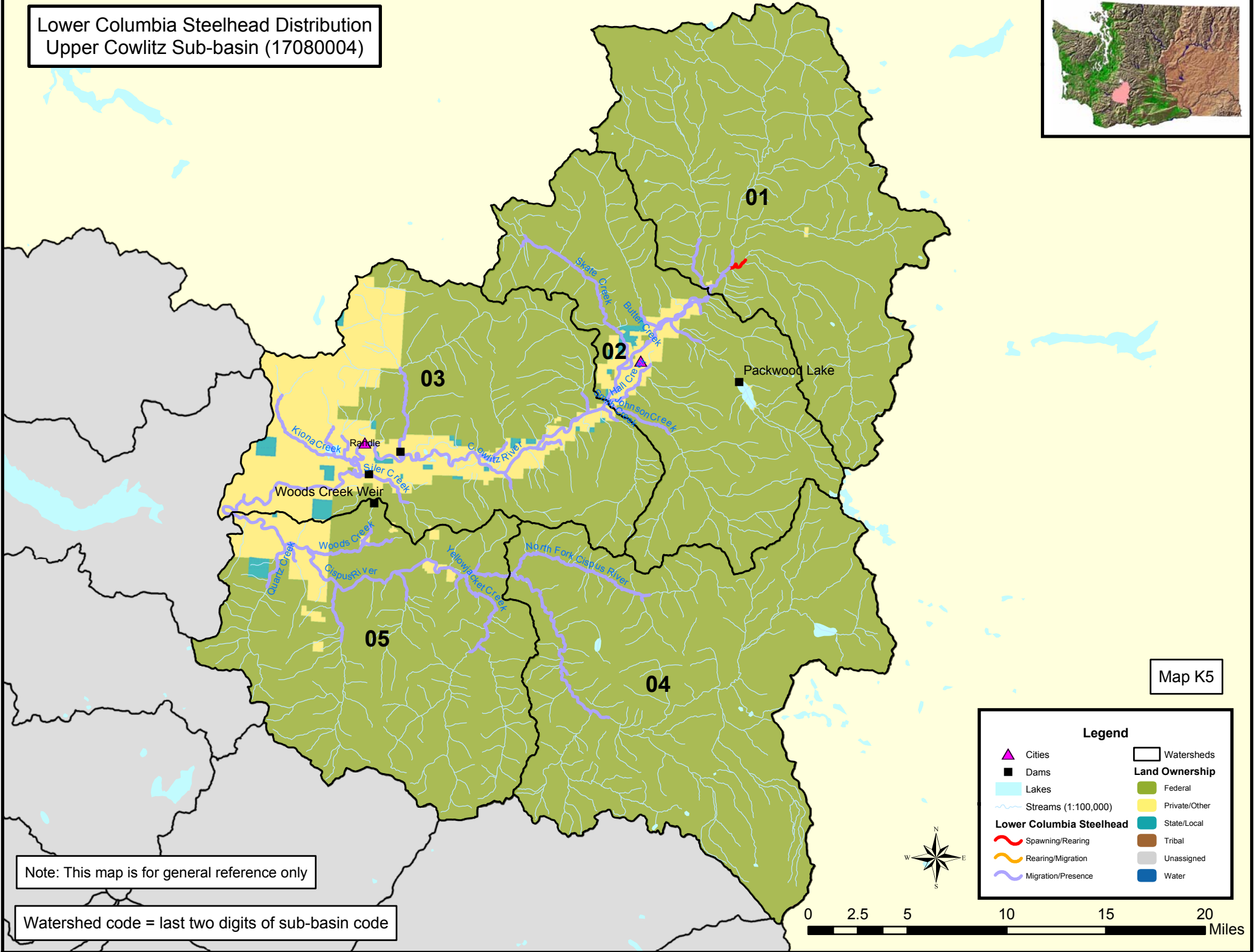
Lower Columbia Steelhead Distribution
Lower Columbia/Clatskanie Sub-basin (17080003)



Legend

Cities	Watersheds
Dams	Land Ownership
Streams (1:100,000)	Federal
Lower Columbia Steelhead	Private/Other
Spawning/Rearing	State/Local
Rearing/Migration	Tribal
Migration/Presence	Unassigned
	Water

Lower Columbia Steelhead Distribution
Upper Cowlitz Sub-basin (17080004)



Note: This map is for general reference only

Watershed code = last two digits of sub-basin code

Map K5

Legend

Cities

Dams

Lakes

Streams (1:100,000)

Spawning/Rearing

Rearing/Migration

Migration/Presence

Land Ownership

Federal

Private/Other

State/Local

Tribal

Unassigned

Water

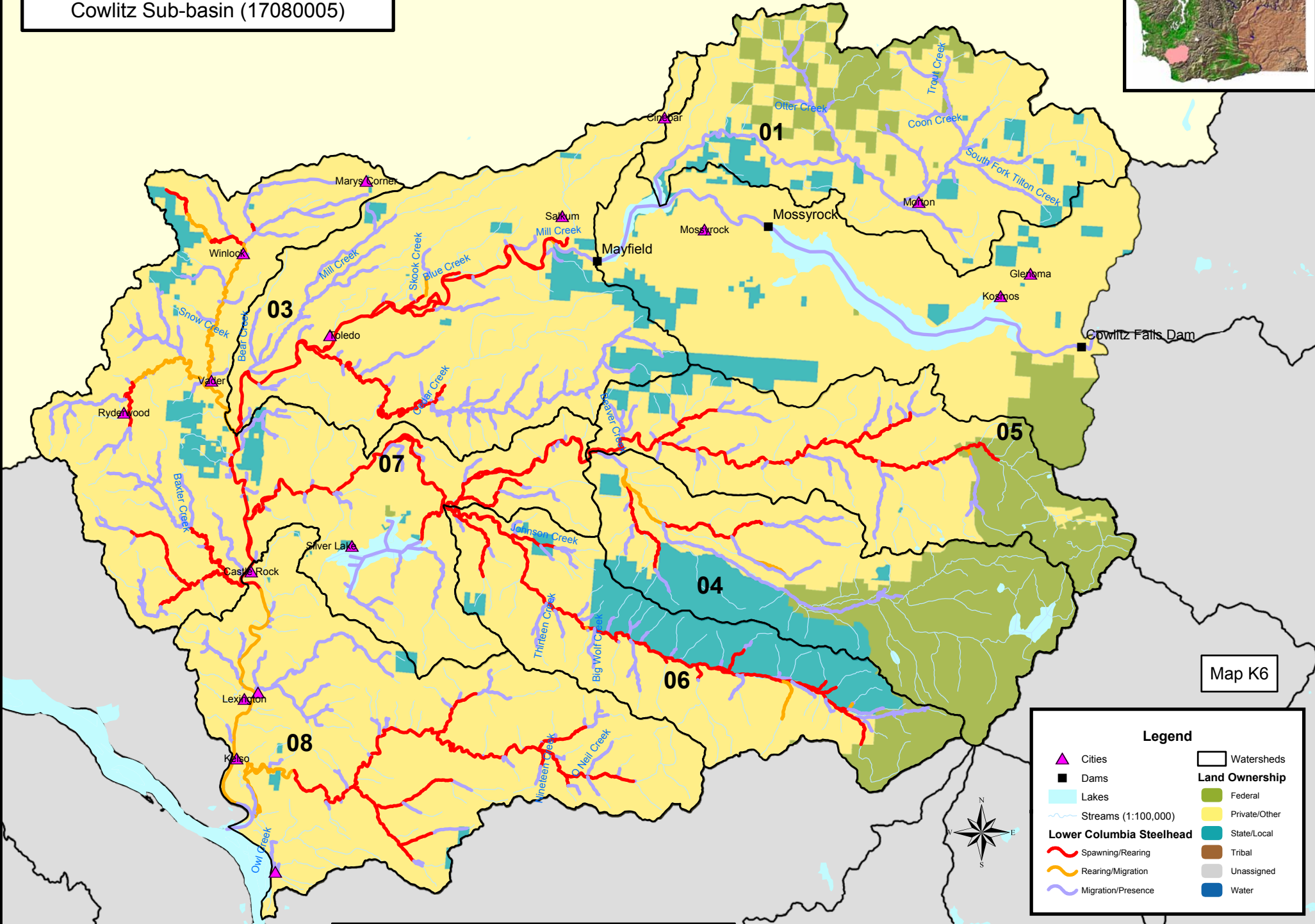
Lower Columbia Steelhead

Spawning/Rearing

Rearing/Migration

Migration/Presence

Lower Columbia Steelhead Distribution
Cowlitz Sub-basin (17080005)



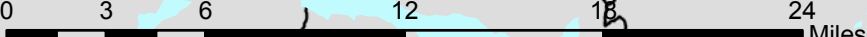
Map K6

Legend

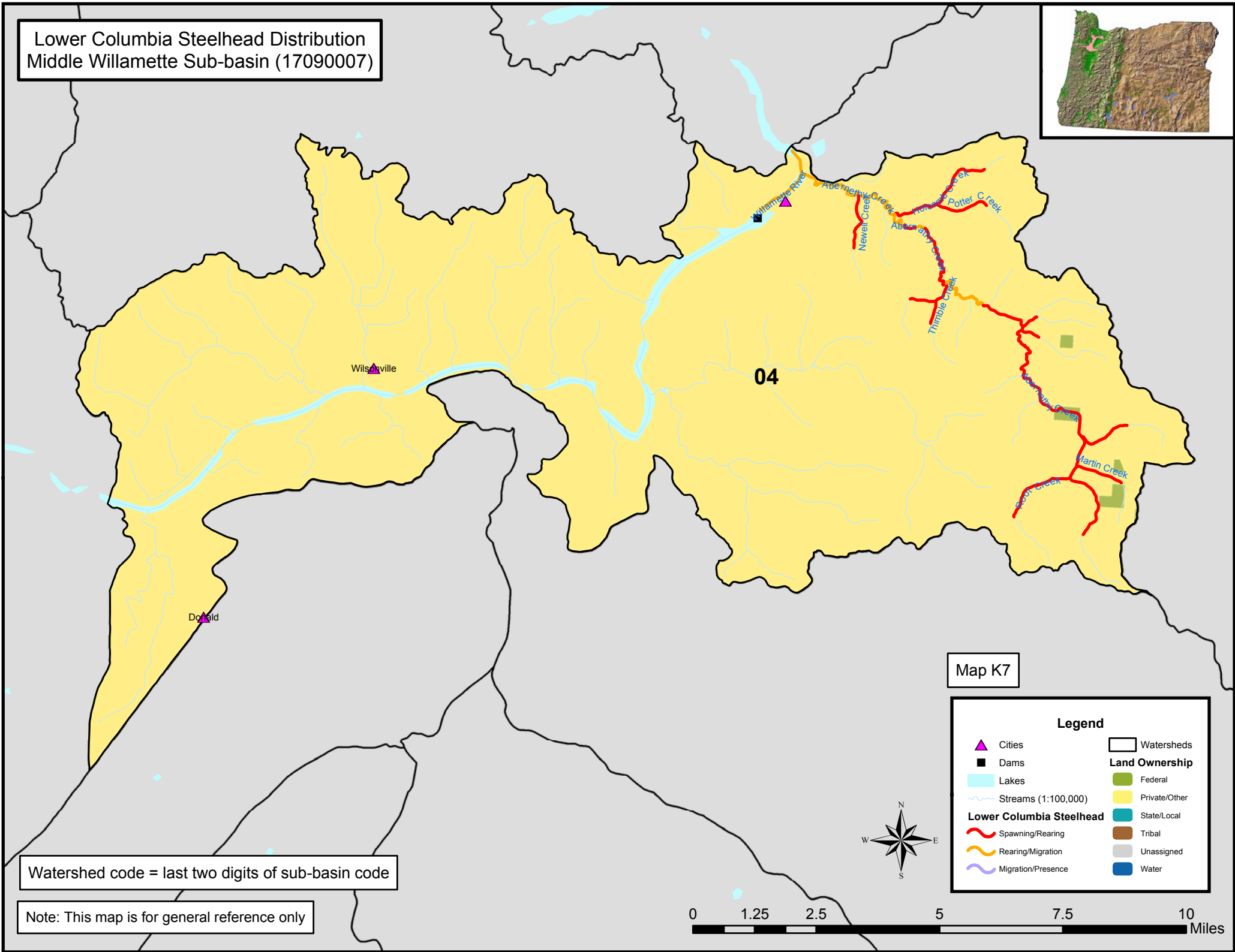
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Note: This map is for general reference only

Watershed code = last two digits of sub-basin code



Lower Columbia Steelhead Distribution
Middle Willamette Sub-basin (17090007)



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Map K7

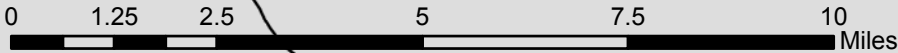
Legend

Cities
 Dams
 Lakes
 Streams (1:100,000)
 Lower Columbia Steelhead
 Spawning/Rearing
 Rearing/Migration
 Migration/Presence

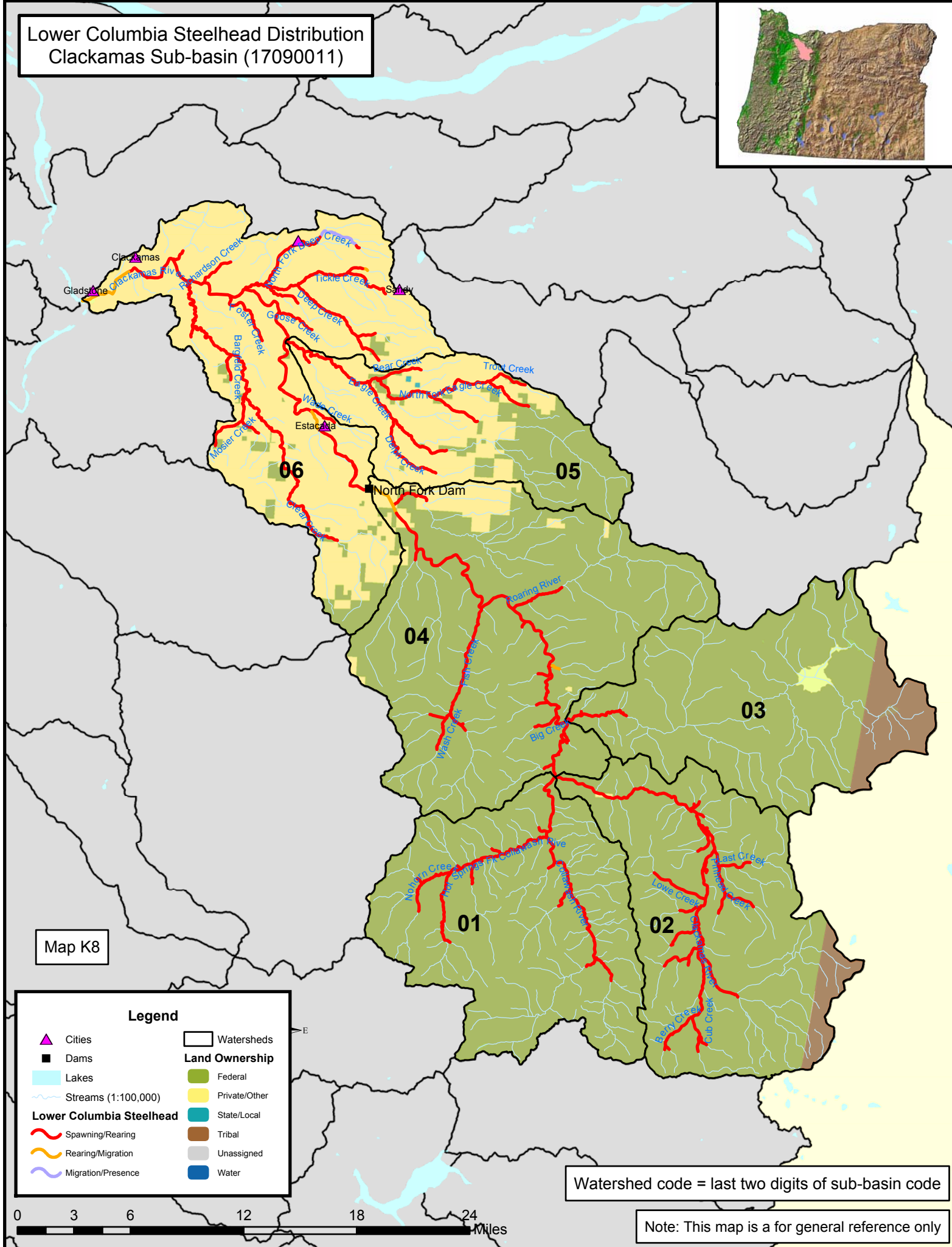
Watersheds

Land Ownership

 Federal
 Private/Other
 State/Local
 Tribal
 Unassigned
 Water



Lower Columbia Steelhead Distribution Clackamas Sub-basin (17090011)



Map K8

Legend

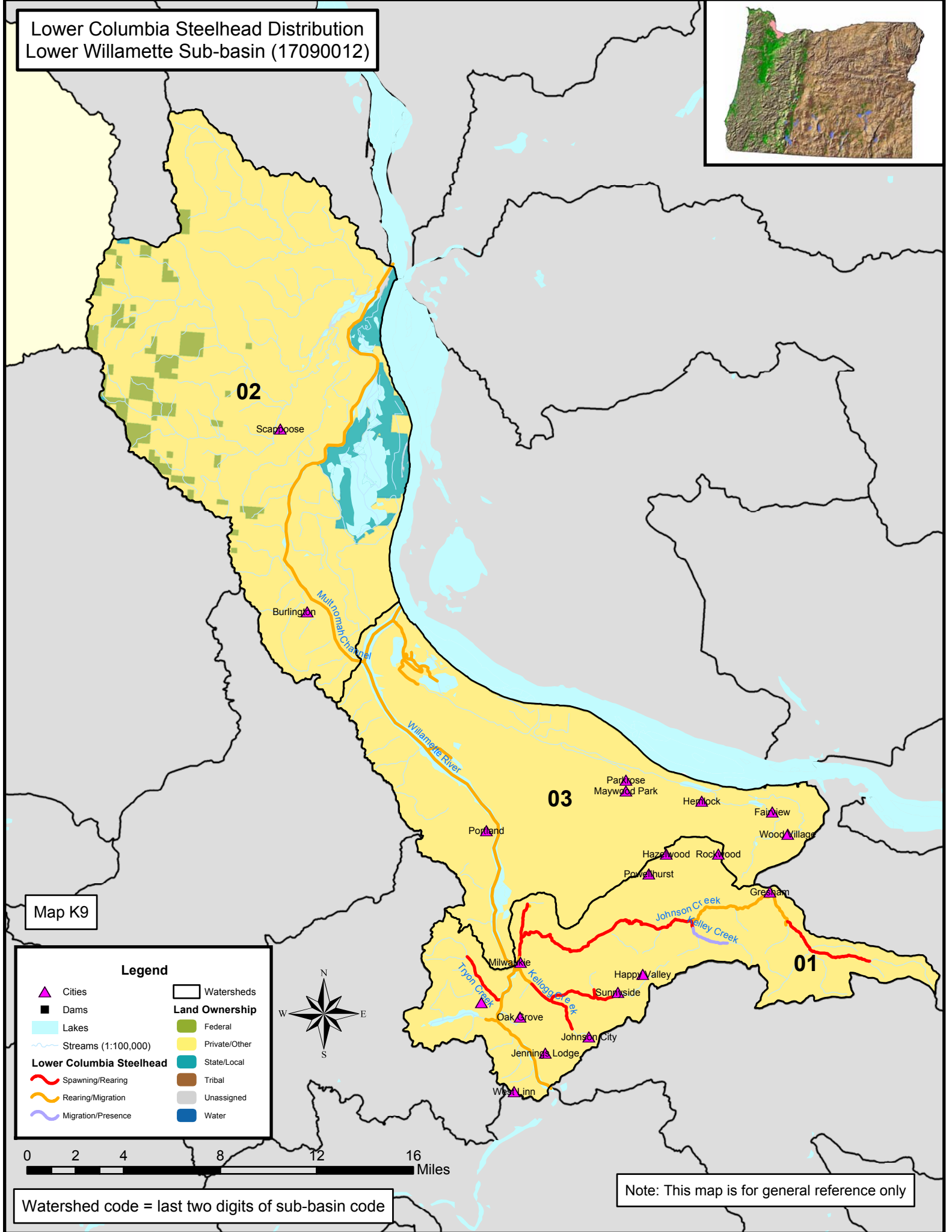
- | | | | |
|---------------------------------|-------------------|--------------------|---------------------|
| Cities | Dams | Lakes | Streams (1:100,000) |
| Lower Columbia Steelhead | | | |
| Spawning/Rearing | Rearing/Migration | Migration/Presence | |
| Land Ownership | | Watersheds | |
| Federal | Private/Other | State/Local | Tribal |
| Unassigned | Water | | |

Watershed code = last two digits of sub-basin code

Note: This map is a for general reference only

0 3 6 12 18 24 Miles

Lower Columbia Steelhead Distribution Lower Willamette Sub-basin (17090012)



Map K9

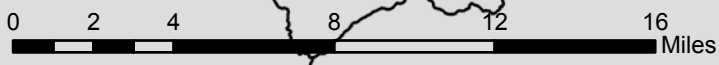
Legend

- Cities
- Dams
- Lakes
- Streams (1:100,000)
- Lower Columbia Steelhead**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only